# **EXHIBIT D.2**



### (12) United States Patent Doser et al.

(45) Date of Patent: \*Nov. 10, 2015

#### (54) METHODS AND SYSTEMS FOR DISPLAYS WITH CHROMATIC CORRECTION WITH DIFFERING CHROMATIC RANGES

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Boulogne-Billancourt (FR)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 1026 days.

This patent is subject to a terminal dis-

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§ 371 (c)(1).

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PCT Pub. Date: Oct. 16, 2008

(5) Prior Publication Data

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#### Related U.S. Application Data

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(51) Int. CL. G09G 5/00

G09G 5/00 (2006.01) G09G 5/10 (2006.01)

(Continued)

(52) U.S. Cl.

H04N L/6058 (2013.01); G09G 5/02 (2013.01)

#### (58) Field of Classification Search

(10) Patent No.:

345/581, 589-591, 600-604, 606, 345/617-620, 548-549, 204, 690, 1.1-1.2, 345/1.3, 3.1, 22, 63, 87-88; 348/253-254, 348/256, 467, 552, 555, 557, 560, 571, 577, 348/602-603, 630, 671-675, 708, 739; 358/515-518, 520, 523, 525, 448, 461; 382/162, 166-167, 254, 274, 276

US 9,185,268 B2

See application file for complete search history.

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(Continued)

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OTHER PUBLICATIONS

International Search Report, dated Nov. 18, 2008. (Continued)

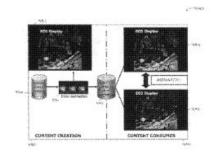
Primary Examiner - Wesner Sajous

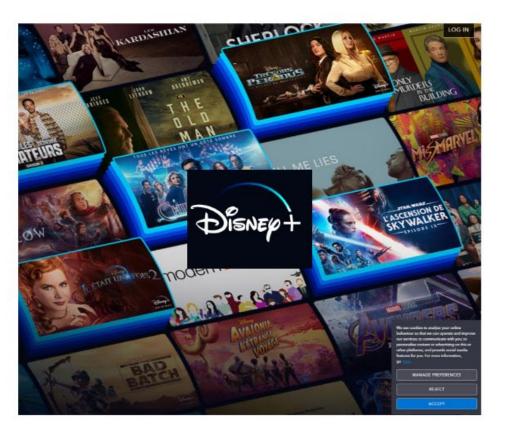
(74) Attorney, Agent, or Firm - Robert D. Shedd; Lily Neff

(57) ABSTRAC

There are provided methods and systems for color correcting displays with different color gamuts. A method includes performing color correction on source picture content, using at least one of a non-reference type display having a non-reference color gamut and a reference type display having a non-reference color gamut. The performing step includes mastering the source picture content to provide mastered color corrected picture content for display on the non-reference type displays having a non-reference color gamut. The performing step further includes generating metadata for a color gamut mapping that color transforms the mastered color corrected picture content for display on reference type displays having a reference color gamut. The source picture content is mastered only for the non-reference type displays having the non-reference color gamut.

#### 30 Claims, 8 Drawing Sheets





CLAIM	PUBLIC DOCUMENTATION	
1[pre] A method for color correcting, comprising:	The Disney Accused Instrumentalities perform a method for color correcting. For example, the Disney Accused Instrumentalities are color corrected using Dolby Vision.	
	The following citations provide evidence of the Dolby Vision workflow, which is used by the Accused Instrumentalities.	
	Dolby Vision workflow includes a color correction method in the production step:	
	color correcting method	
	PRODUCTION DISTRIBUTION PLAYBACK	
	PREPRODUCTION/ POSTPRODUCTION DIGITAL ENCODING DELIVERY	
	VISUAL CAPTURE  VFX  COLOR GRADING  MEZZANINE ENCODING  DOLBY VISION METADATA  DOLBY VISION	
	Workflow extracted from DoblyVision_white-paper10_V2.pdf document	

CLAIM	Public Documentation	
	The objective of this document is to provide information and clear guidelines for creating the best possible Dolby Vision HDR Master and the Dolby Vision Dynamic Metadata using a color correction system. It is assumed that the source material used for this purpose will be of the highest quality available and the system is running the released Dolby Vision version of software.  The Dolby Vision content creation process involves the following steps. Steps 1, 2 and 4 are required.  1. Create the HDR Master 2. Create Level 1 (L1) Analysis Dolby Vision Metadata 3. Optionally apply creative Level 2 (L2) Trim Metadata 4. Create Deliverables	
1[a] performing color correction on source picture content, using at least one of a non-reference type display having a non-reference color gamut	Text extracted from Dolby Vision Color Grading Best Practices Guide Version 4.3, Feb. 18, 2021 document  The Disney Accused Instrumentalities perform a method of performing color correction on source picture content, using at least one of a non-reference type display having a non-reference color gamut. For example, the Disney Accused Instrumentalities are color corrected using Dolby Vision.	

# Case 2:25-cv-00895-WLH-RAO Document 1-8 Filed 02/02/25 Page 5 of 15 Page ID #:284

CLAIM	Public Documentation
	The following citations provide evidence of the Dolby Vision workflow, which is used by the Accused Instrumentalities.
	For example, Dolby Vision workflow performs a color correction on source picture content, using a non-reference type display having a non-reference color gamut.

CLAIM	PUBLIC DOCUMENTATION	ON
CLAIM	Dolby Professional  Workflows Solutions Training & certification Support & documentation  Use your tools to create your Dolby Vision master  Dolby Vision master  Dolby Vision* is supported and integrated into the top color-grading and mastering tools.  Color-grading workflow for TVs and other devices  Creating the Dolby Vision master begins with creating your master HDR grade first, using a color-grading or mastering system with the PQ EOTF (SMPTE ST. 2084) and a working color space of P3 or Rec 2020.	creating the master HDR is the color correction process which is performed on a non-reference display (HDR display having
	In order to see the proper peak brightness levels, deep blacks, and wide color gamut to create an incredible-looking HDR image, Dolby has recommended guidelines which closely follow the EBU Tech 3320 specification for a grade 1 HDR mastering monitor. It should be:  At least 1,000 nits of peak brightness At least a 200,000:1 contrast ratio A minimum black level performance of 0.005 nits At least 99% of the P3 Color Gamut	recommended specifications by Dolby), having a non-reference color gamut (ex: P3 or Rec 2020 color gamut)
	Tex extracted from https://professional.dolby.com/content-creation/o	lolby-vision-for-content-creators/ site.

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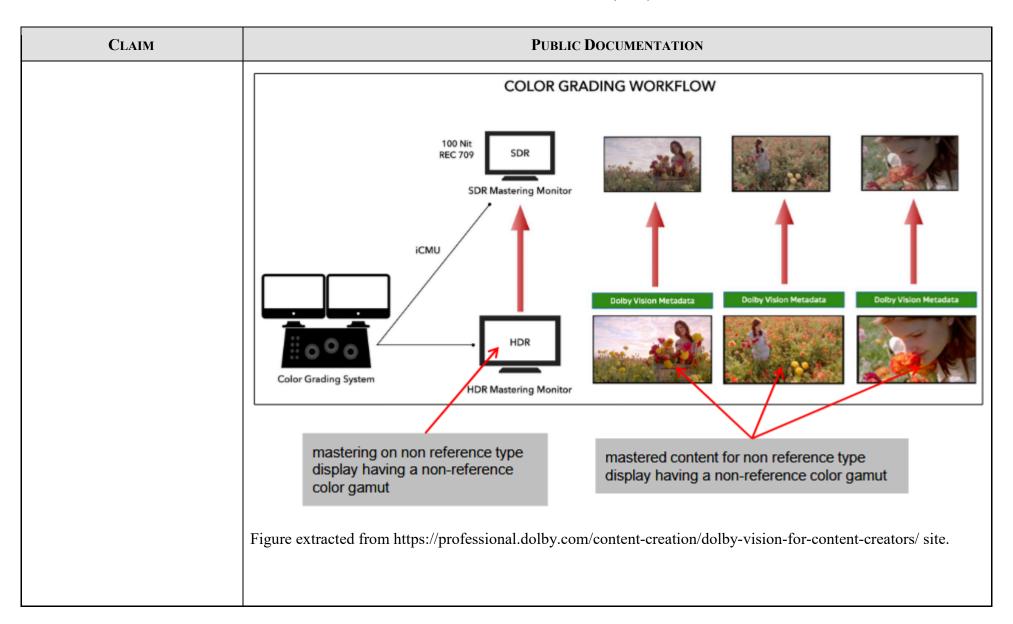
CLAIM	PUBLIC DOCUMENTATION
1[b] and a reference type display having a reference color gamut,	The Disney Accused Instrumentalities perform a method of performing color correction on source picture content, using at least one of a reference type display having a reference color gamut. For example, the Disney Accused Instrumentalities are color corrected using Dolby Vision.
	The following citations provide evidence of the Dolby Vision workflow, which is used by the Accused Instrumentalities.
	For example, Dolby Vision workflow performs a color correction on source picture content, using a reference type display having a reference color gamut.

# Case 2:25-cv-00895-WLH-RAO Document 1-8 Filed 02/02/25 Page 8 of 15 Page ID #:287

CLAIM	Public Documentation	
CLAIM	Dolby Vision workflow generates automatic metadata that provides a tone-mapped version from HDR graded content for a reference display (ex: SDR 100 nits) with a reference gamut (ex. Rec 709)  Once the master HDR grade is complete, you simply un the Dolby Vision analysis to automatically generate three metadata values for each shot that represent the minimum, average, and maximum luminance levels. This function is integrated into the most popular video color-grading and mastering tools. The Dolby Vision shot-by-shot metadata then allows you to see the content tone-mapped in real time, to SDR Rec. 709 100 nits, (as well as other HDR display targets like 600 nits), through a Content Mapping Unit (CMU for short). This can be either an internal integrated process	
	through a Content Mapping Unit (CMU for short). This can be either an internal integrated process or an external unit (iCMU or eCMU).  When viewing the mapped version through the CMU process, many content creators then want to make adjustments to the metadata on a shot-by-shot basis using additional "artistic trim controls."  This creates an additional level of metadata in a list and easy way. The combined automatic and artistic trim metadata travels with the HDR image to Dolby Vision TV's and devices to help best deliver the creative intent of the HDR master by mapping each shot to the capabilities of the consumer device. Analysis metadata creation is included in many professional video tools at no charge. Artistic trims are available in color-grading systems but require an annual license from Dolby.	
	the tone-mapped version metadata could be adjusted manually shot by shot by using additional « artistic trim controls »  Text extracted from https://professional.dolby.com/content-creation/dolby-vision-for-content-creators/ site.	
1[c] wherein said performing step comprises: mastering the	The Disney Accused Instrumentalities perform a method wherein said performing step comprises: mastering the source picture content to provide mastered color corrected picture content for display on the non-reference type	

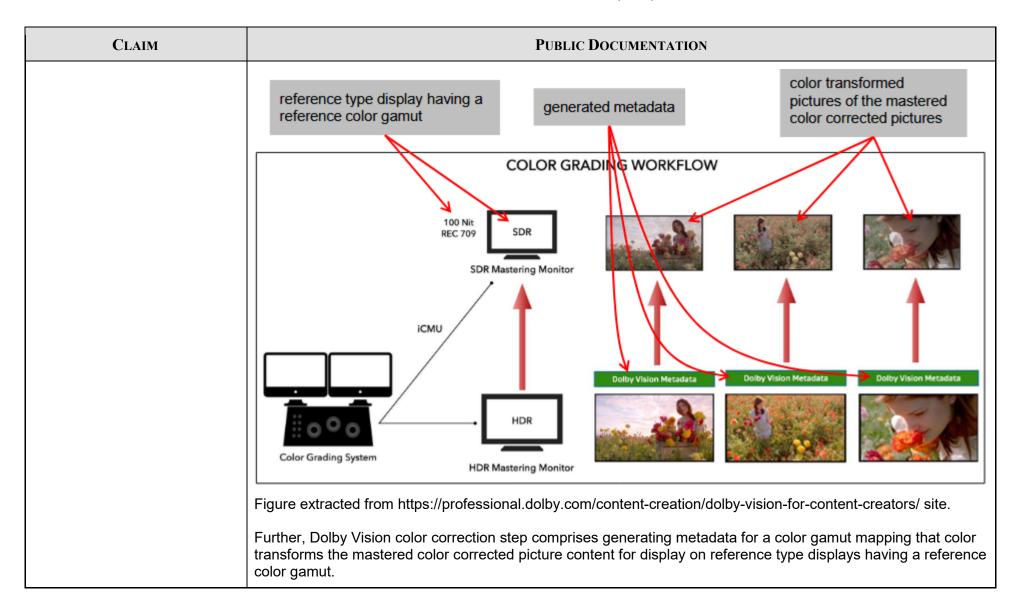
# Case 2:25-cv-00895-WLH-RAO Document 1-8 Filed 02/02/25 Page 9 of 15 Page ID #:288

CLAIM	PUBLIC DOCUMENTATION
source picture content to provide mastered color corrected picture content for display on the non-reference	displays having a non-reference color gamut. For example, the Disney Accused Instrumentalities are color corrected using Dolby Vision.
type displays having a non- reference color gamut;	The following citations provide evidence of the Dolby Vision workflow, which is used by the Accused Instrumentalities.
	For example, Dolby Vision color correction step comprises mastering the source picture content to provide mastered color corrected picture content for display on the non-reference type displays having a non-reference color gamut.



# Case 2:25-cv-00895-WLH-RAO Document 1-8 | Filed 02/02/25 | Page 11 of 15 | Page 1D #:290

CLAIM	PUBLIC DOCUMENTATION	
1[d] and generating metadata for a color gamut mapping that color transforms the mastered color corrected picture content for display on reference type displays having a reference color gamut,	The Disney Accused Instrumentalities perform a method of generating metadata for a color gamut mapping that color transforms the mastered color corrected picture content for display on reference type displays having a reference color gamut. For example, the Disney Accused Instrumentalities are color corrected using Dolby Vision.  The following citations provide evidence of the Dolby Vision workflow, which is used by the Accused Instrumentalities.  For example, Dolby Vision color correction step comprises generating metadata for a color gamut mapping that color transforms the mastered color corrected picture content for display on reference type displays having a reference color gamut.	



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CLAIM	PUBLIC DOCUMENTATION
	2.2 Color Grading (Updated Guidance)  Use a certified Dolby Vision color corrector for Dolby Vision metadata creation. Here are many
	acceptable color pipeline workflows for the timeline/color corrector, but the output color space must be set to ST.2084 (PQ), and either P3D65 or Rec.2020 for monitoring and delivery. Dolby recommends using Full Range levels throughout the HDR grade and Dolby Vision Metadata creation process. Consult your studio spec for further specific guidance. (Also, see section 3 a reference color gamut for color gamut considerations).
	The entire range of tools in the color corrector are available to create the best fIDR images according to the creative brief and requirement. Be careful not to clip lightlights in the HDR master as these cannot be recovered in the mapped/derived Rec.709 SDR target The Dolby Vision content mapping algorithms are designed to maintain the look and intent of the HDR master.  A list of approved partner products supporting Dolby Vision can be found at our website:
	https://www.dolby.com/us/en/technologies/dolby-vision/dolby-vision-for-creative-professionals.html
	Dolby Vision Color Grading Best Practices Guide 7
	Text extracted from Dolby VisionColor Grading Best Practices GuideVersion 4.3, Feb. 18, 2021 document.
1[e] wherein the source picture content is mastered only for the non-reference type displays having the non-reference color gamut.	The Disney Accused Instrumentalities perform a method wherein the source picture content is mastered only for the non-reference type displays having the non-reference color gamut. For example, the Disney Accused Instrumentalities are color corrected using Dolby Vision.

# Case 2:25-cv-00895-WLH-RAO Document 1-8 Filed 02/02/25 Page 14 of 15 Page ID #:293

CLAIM	PUBLIC DOCUMENTATION
	The following citations provide evidence of the Dolby Vision workflow, which is used by the Accused Instrumentalities.
	For example, the source picture content is mastered only for the non-reference type displays having the non-reference color gamut.

# Case 2:25-cv-00895-WLH-RAO Document 1-8 Filed 02/02/25 Page 15 of 15 Page ID #:294

